

What is claimed is:

- 1 1. A method for estimating a I/Q imbalance parameter
2 of a receiver, comprising the steps of:
 - 3 transmitting a first signal modulated by a first and a
4 second modulated carrier through a modulation
5 path at a transmitter;
 - 6 receiving the first signal demodulated by a first and a
7 second demodulated carrier respectively through a
8 first and a second demodulation path at a
9 receiver;
 - 10 transmitting a second signal modulated by the first and
11 the second modulated carrier through the
12 modulation path at the transmitter;
 - 13 receiving the second signal demodulated by the first
14 and the second demodulated carrier respectively
15 through the first and second demodulation path at
16 the receiver; and
 - 17 deriving the I/Q imbalance parameter of the receiver
18 according to the first and the second signal
19 transmitted by the transmitter and the
20 demodulated first and the second signal received
21 by the receiver;
 - 22 wherein the first and second signal are symmetrical in
23 frequency domain.
- 1 2. The method of claim 1, wherein the first modulated
2 carrier is a real-value modulated carrier, the second
3 modulated carrier is an imaginary-value modulated carrier,
4 the modulation path is one of I_channel and Q_channel, the

5 first demodulation path is a I_channel, the second
6 demodulation path is a Q_channel, the first demodulated
7 carrier is a real-value demodulated carrier, and the second
8 demodulated carrier is an imaginary-value demodulated
9 carrier.

1 3. The method of claim 1, wherein the real part of
2 the first signal is symmetric while the imaginary part of
3 the first signal is anti-symmetric in frequency domain.

1 4. The method of claim 3, wherein amplitudes of the
2 real and imaginary part of the first signal are the same in
3 frequency domain.

1 5. The method of claim 1, wherein the real part of
2 the second signal is anti-symmetric while the imaginary part
3 of the second signal is symmetric in frequency domain.

1 6. The method of claim 5, wherein amplitudes of the
2 real and imaginary part of the second signal are the same in
3 frequency domain.

1 7. The method of claim 1, wherein the amplitude of
2 the real and the imaginary part of the first and second
3 signals are either +1 or -1.

1 8. A method for transmitter I/Q imbalance estimation
2 comprising the steps of:

3 transmitting a third signal modulated by a first
4 modulated carrier through a first modulation
5 path;

6 transmitting a fourth signal modulated by a second
7 modulated carrier through a second modulation
8 path, wherein the third signal and the fourth
9 signal are symmetrical in frequency domain;
10 receiving the third signal demodulated by a first
11 demodulated carrier through a demodulation path;
12 receiving the fourth signal demodulated by a second
13 demodulated carrier through the demodulation
14 path; and
15 deriving an I/Q imbalance of the transmitter according
16 to the demodulated third and the fourth signals.

1 9. The method of claim 8, wherein the first modulated
2 carrier is a real-value modulated carrier, the second
3 modulated carrier is an imaginary-value modulated carrier,
4 the first modulation path is a I_channel, the second
5 modulation path is a Q_channel, the demodulation path is one
6 of I_channel and Q_channel, the first demodulated carrier is
7 a real-value demodulated carrier ,and the second demodulated
8 carrier is an imaginary-value demodulated carrier.

1 10. The method of claim 8, wherein the real and the
2 imaginary part of the third and the fourth signal are
3 symmetric in frequency domain.

1 11. The method of claim 10, wherein amplitudes of the
2 real and imaginary part of the third and the fourth signal
3 are the same in frequency domain.

1 12. An apparatus for estimation of transmitter I/Q
2 imbalance in a communication system, the apparatus
3 comprising:

4 a signal generator for generating a first and a second
5 signals, wherein the first and the second signals
6 are symmetrical in frequency domain;
7 a transmitter for transmitting the first signal
8 modulated by a first modulated signal and the
9 second signal modulated by a second modulated
10 carrier through a first modulation path and a
11 second modulation path; and
12 an estimator for deriving an I/Q imbalance parameter of
13 the transmitter according the first signal and
14 the second signal received by a receiver.

1 13. The apparatus of claim 12, wherein the signal
2 generator further comprises an IFFT processor.

1 14. The apparatus of claim 12, wherein the real and
2 the imaginary part of the first and the second signal are
3 symmetric in frequency domain.

1 15. The apparatus of claim 12, wherein amplitudes of
2 the real and the imaginary part of the first and the second
3 signal are the same in frequency domain.

1 16. An apparatus for estimation of receiver I/Q
2 imbalance in a communication system, comprising:
3 a signal generator for generating a first and a second
4 signal;

5 a transmitter for transmitting the first signal
6 modulated by a first modulated carrier and the
7 second signal modulated by a second modulated
8 carrier, wherein the first and the second signals
9 are transmitted through a I_channel or a
10 Q_channel;
11 a receiver for receiving the first signal demodulated
12 by a first demodulated carrier through a
13 I_channel and demodulated by a second demodulated
14 carrier through a Q_channel, and receiving a
15 second signal demodulated by a first demodulated
16 carrier through a I_channel and demodulated by a
17 second demodulated carrier through a Q_channel;
18 and
19 an estimator for deriving an I/Q imbalance parameter of
20 the receiver from the first and second signals
21 received by the receiver and the first and second
22 signals transmitted by the transmitter.

1 17. The apparatus of claim 16 the receiver further
2 comprising a FFT processor.

1 18. The apparatus of claim 16, wherein the real part
2 of the first signal is symmetric while the imaginary part of
3 the first signal is anti-symmetric in frequency domain.

1 19. The apparatus of claim 18, wherein amplitudes of
2 the real and the imaginary part of the first signal are the
3 same in frequency domain.

1 20. The apparatus of claim 16, wherein the real part
2 of the second signal is anti-symmetric while the imaginary
3 part of the second signal is symmetric in frequency domain.

1 21. The apparatus of claim 20, wherein amplitudes of
2 the real and the imaginary part of the second signal are the
3 same in frequency domain.

1 22. The apparatus of claim 16, wherein the real and
2 the imaginary part of the first and the second signal are
3 either +1 or -1.